

Fig. 1



Docket No.: MS1-1705US  
Inventor(s): Kyle R. Johns and J. Andrew Goossen  
Title: User Interface for Facilitating Performance Analysis for Processing

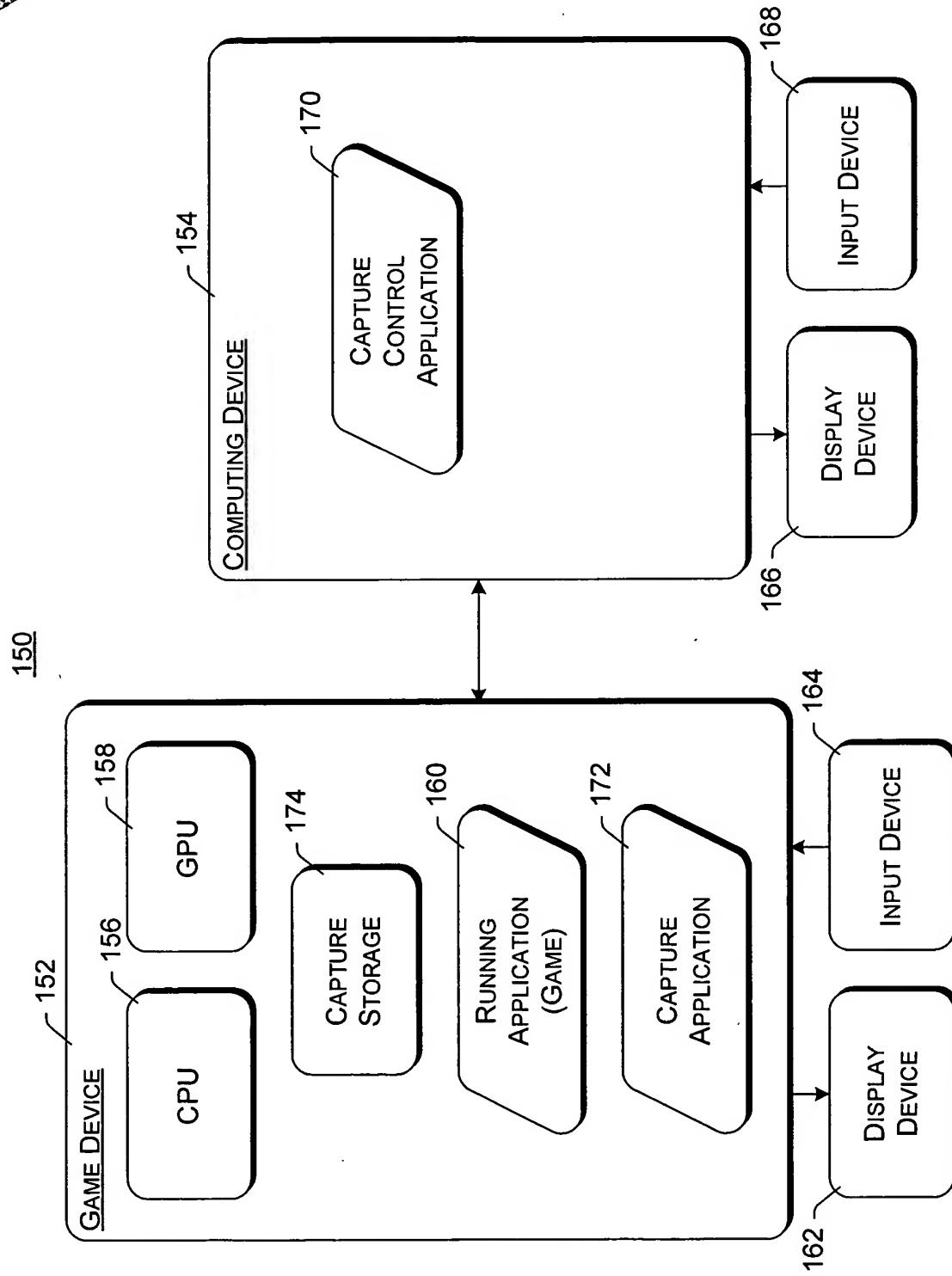


Fig. 2



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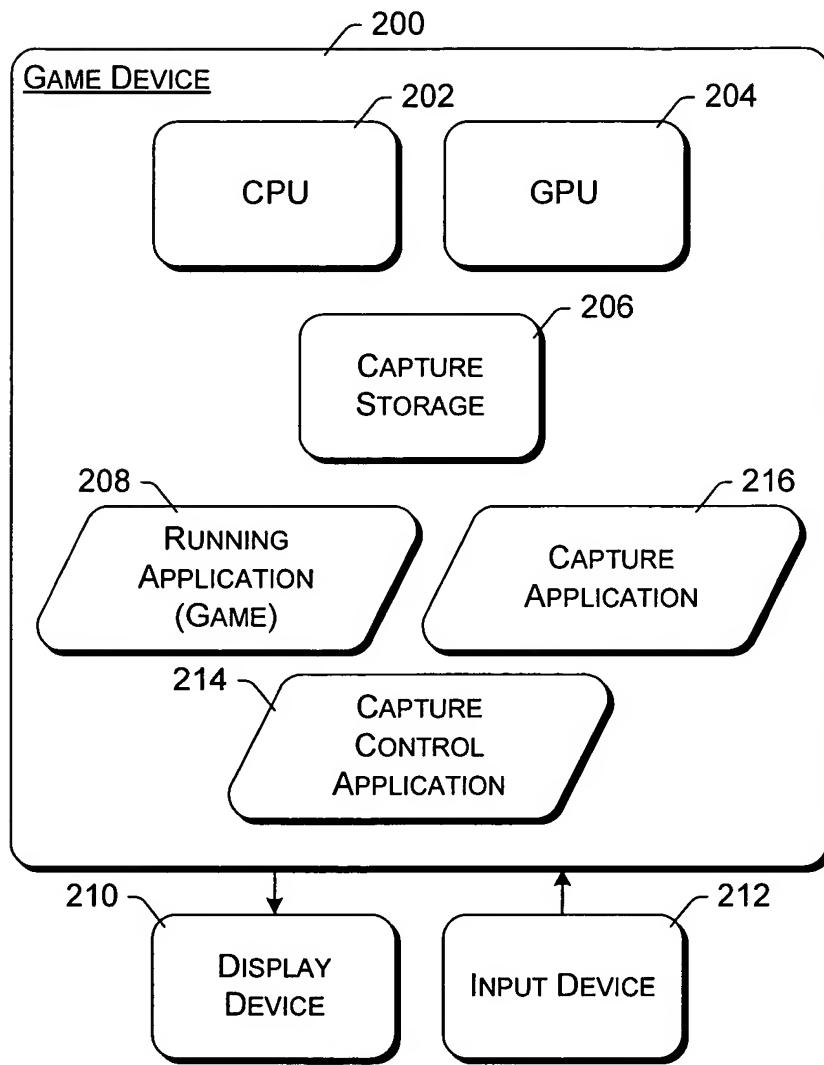
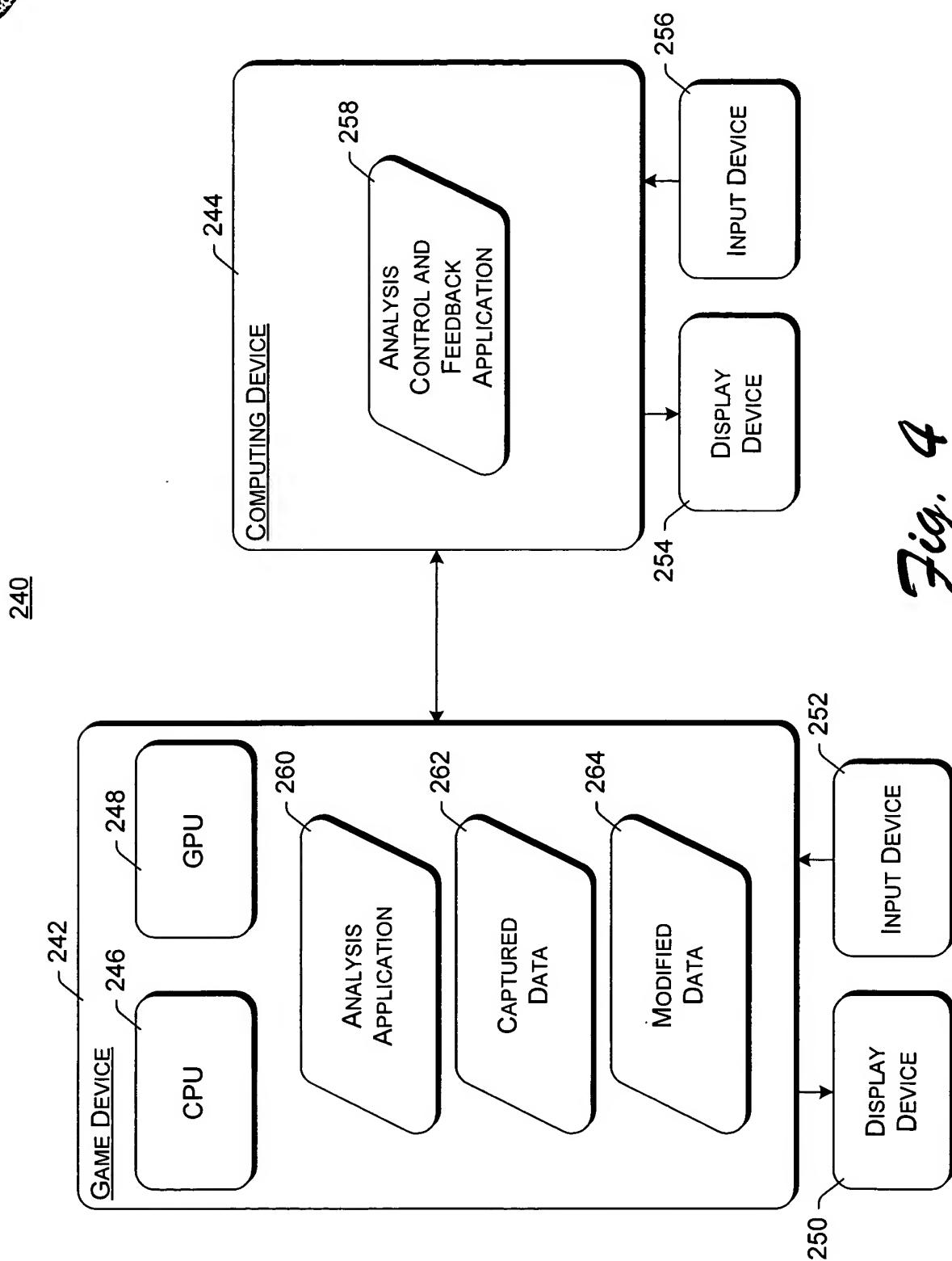


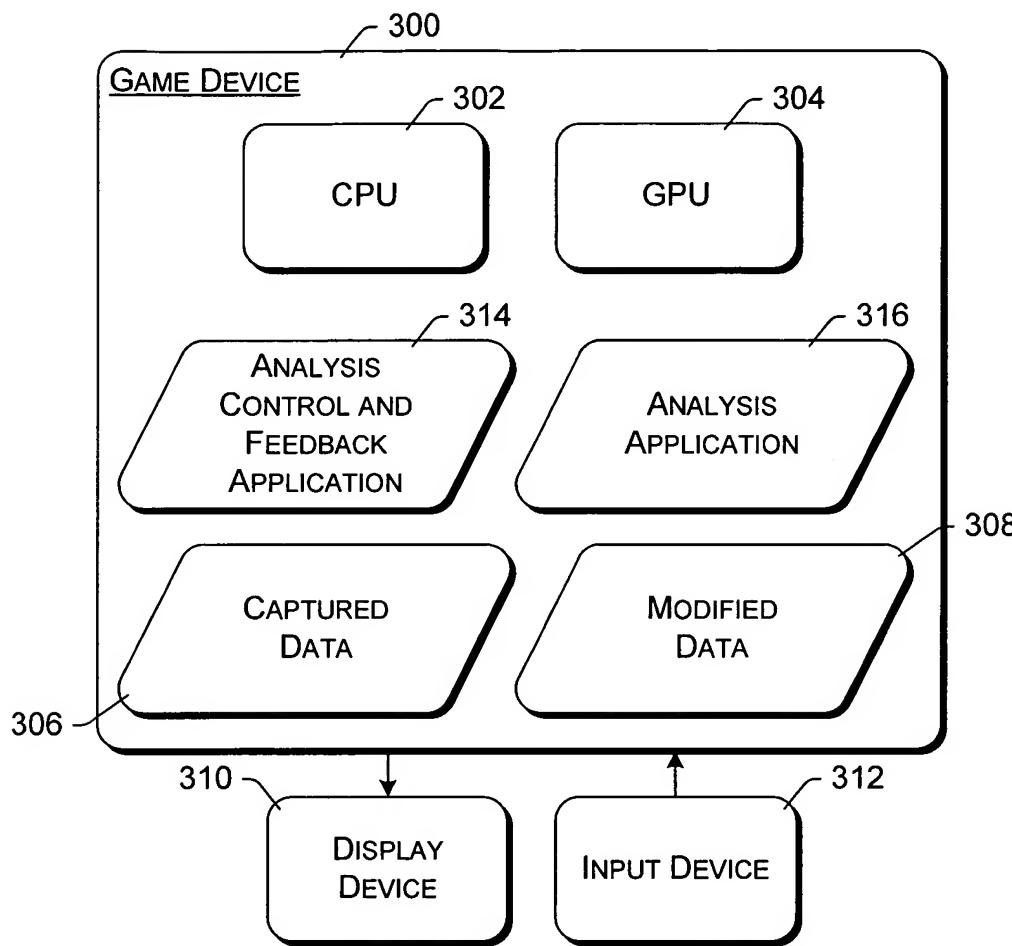
Fig. 3



*Fig. 4*



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*Fig. 5*



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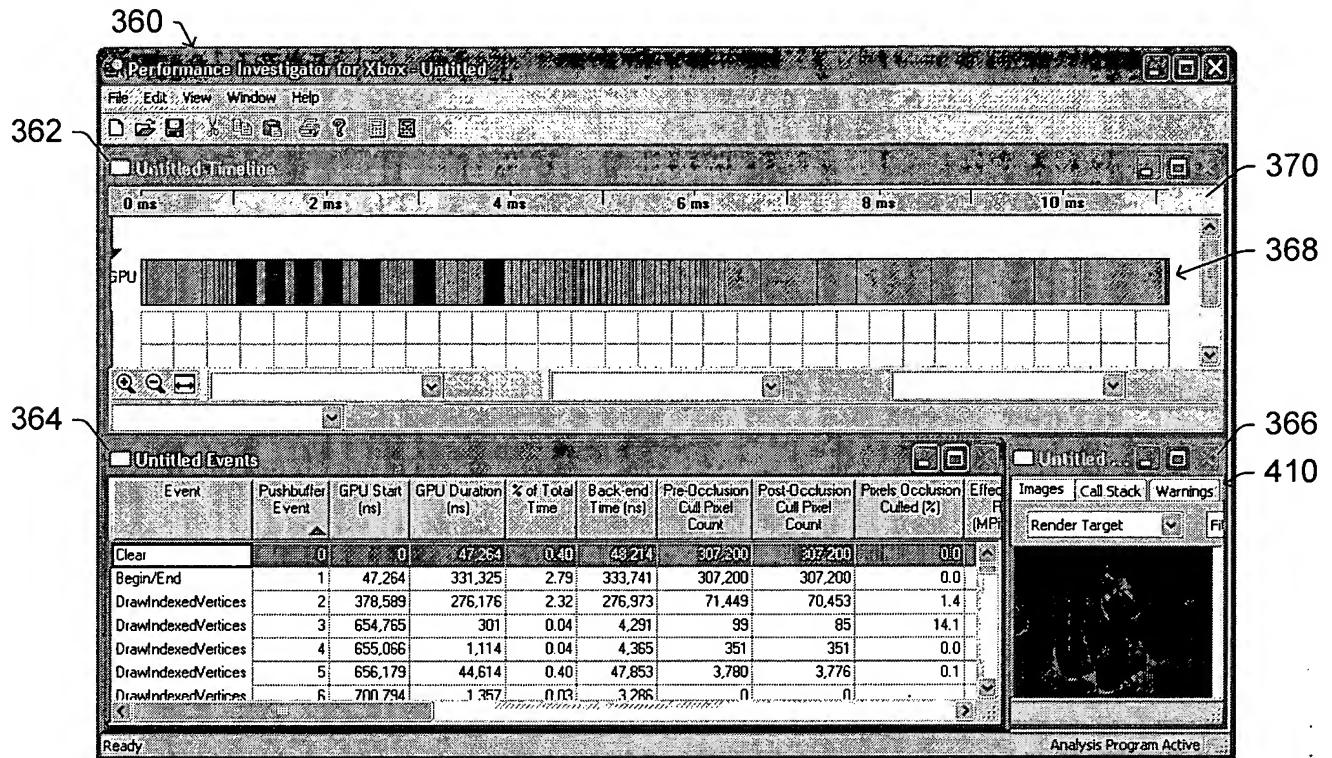


Fig. 7

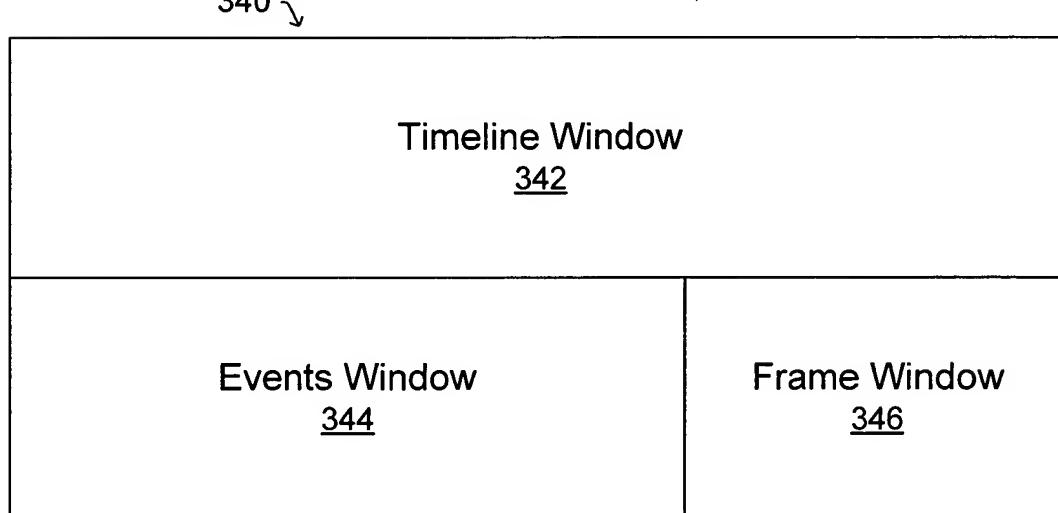


Fig. 6



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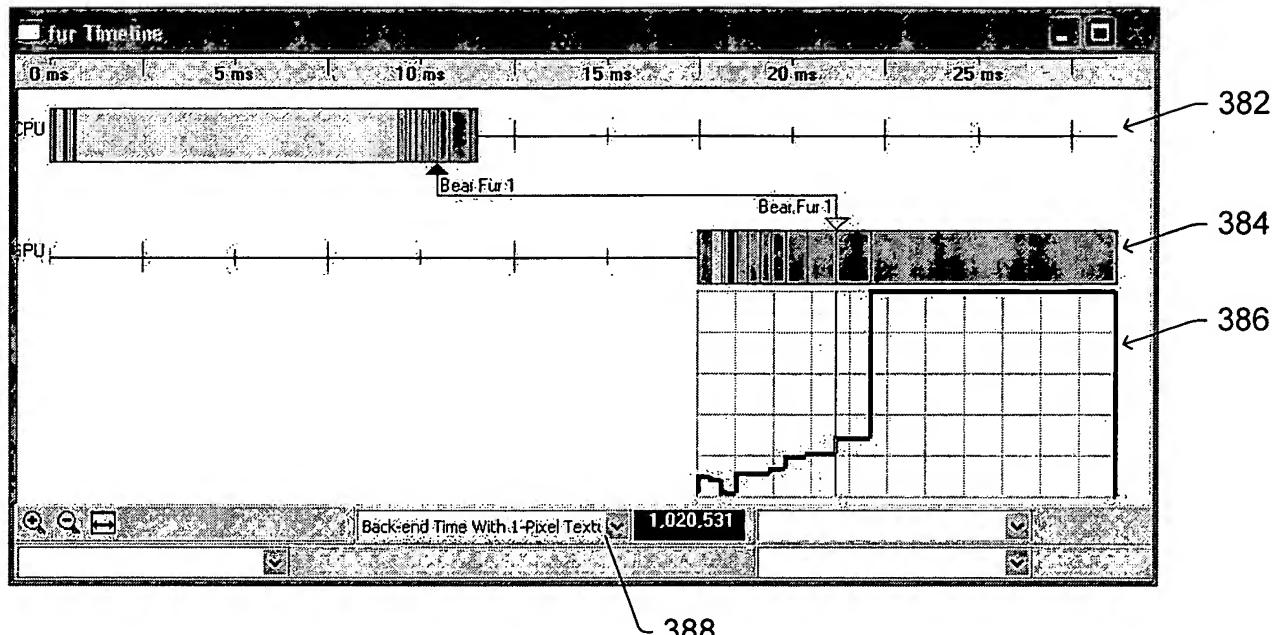


Fig. 8



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Event	ID	CPU Start (ns)	CPU Duration (ns)	GPU Start (ns)	GPU Duration (ns)	% of Total Time	Back-end Time (ns)	Setup Time (ns)
- KickPushBuffer	0	0	14,449	-	-	-	-	-
+ FrameMove	1	36,612	101,750	-	0	-	-	-
- Clear	3	144,537	4,698	15,745,863	48,640	-	-	-
- Begin/End	4	181,781	29,929	15,794,503	331,584	-	-	-
+ Bear Mesh 0								
- DrawIndexedVertices	6	252,563	125,782	16,126,087	278,176	-	-	-
- KickPushBuffer	7	339,091	5,501	-	-	-	-	-
- KickPushBuffer	8	374,790	3,385	-	-	-	-	-
- DrawIndexedVertices	9	386,209	10,399	16,404,263	3,072	-	-	-
- DrawIndexedVertices	10	401,332	6,393	16,407,335	2,656	-	-	-
+ Bear Mesh 1	11	409,555	56,960	16,409,991	45,568	-	-	-
+ Bear Mesh 2	15	466,773	39,522	16,455,559	74,208	-	-	-
+ Bear Mesh 3	19	506,536	91,996	16,529,767	59,072	-	-	-
+ Bear Mesh 4	25	598,778	53,437	16,588,839	47,232	-	-	-
+ Bear Mesh 5	29	652,769	39,348	16,636,071	47,552	-	-	-
+ Bear Mesh 6	33	692,356	37,207	16,683,623	45,248	-	-	-
+ Bear Mesh 7	37	729,799	92,051	16,728,871	50,783	-	-	-
+ Bear Fur 7								
+ DrawFins	44	852,610	122,595	16,779,656	156,932	-	-	-
+ DrawShells	73	975,455	40,536	16,936,616	61,407	-	-	-
+ Bear Fur 6	75	1,019,798	117,933	16,998,024	219,011	-	-	-
+ Bear Fur 5	107	1,138,001	7,341,552	17,217,064	224,739	-	-	-
+ Bear Fur 4	142	8,479,990	164,020	17,441,832	284,642	-	-	-

Fig. 9

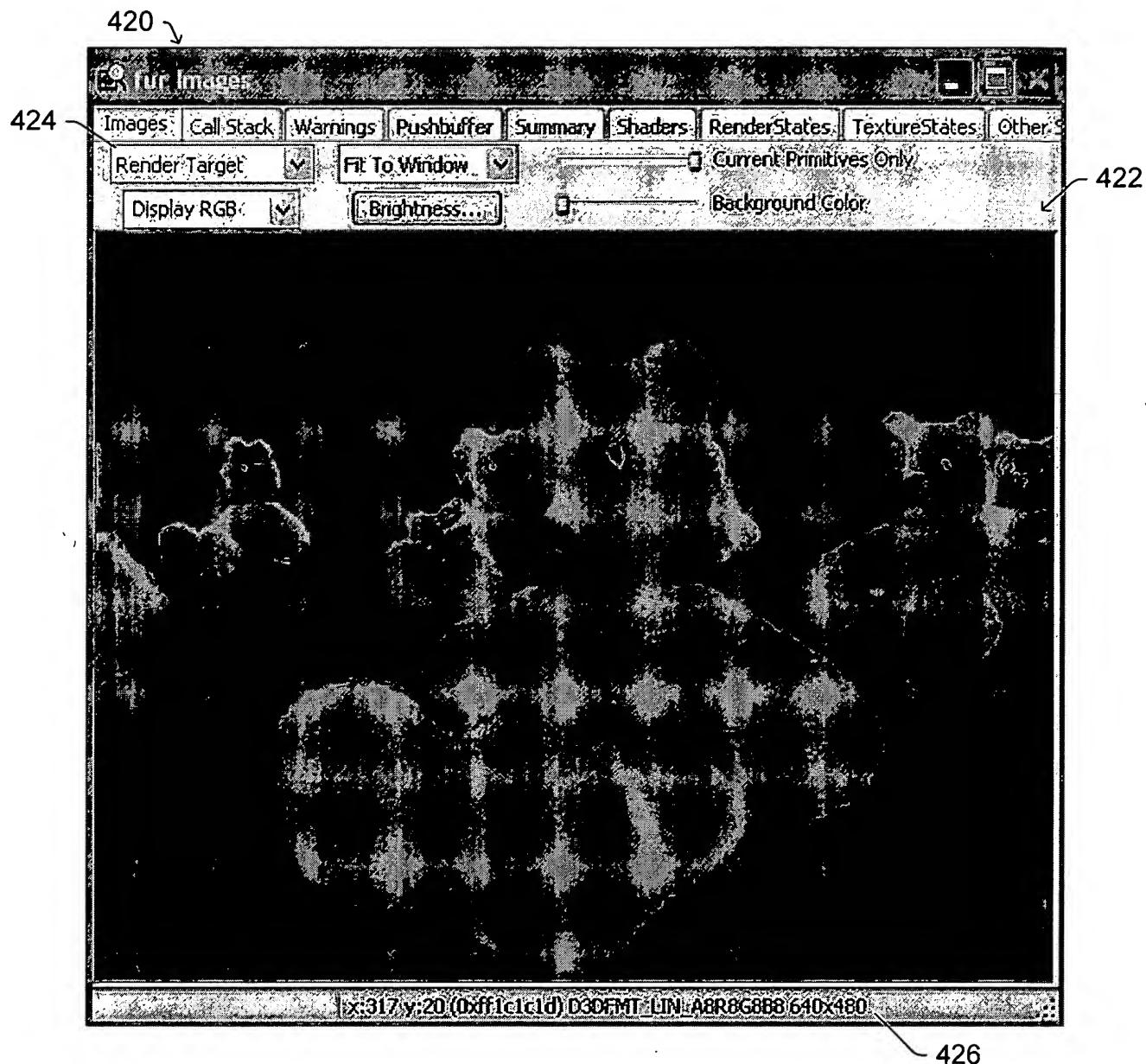


Fig. 10

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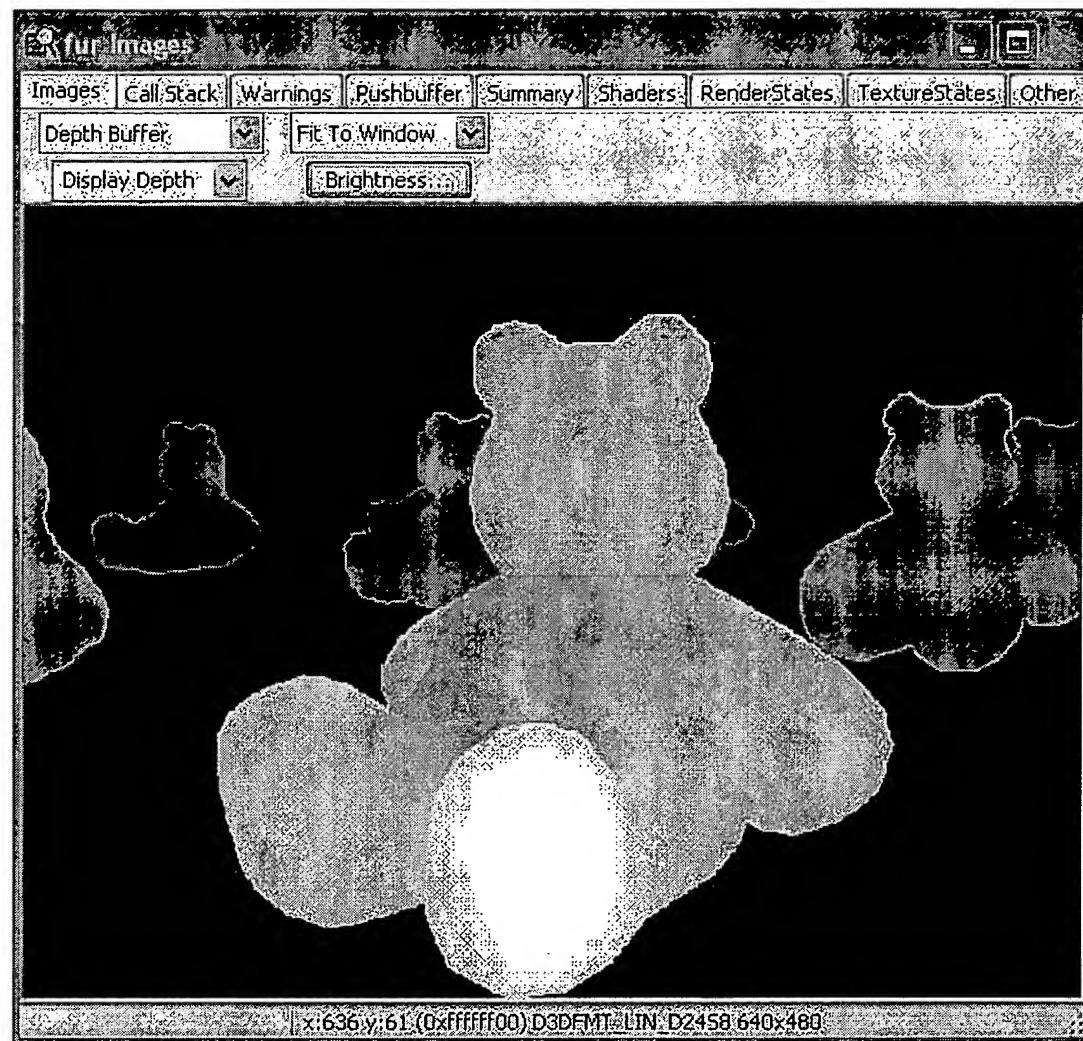


Fig. 11

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420 ↴

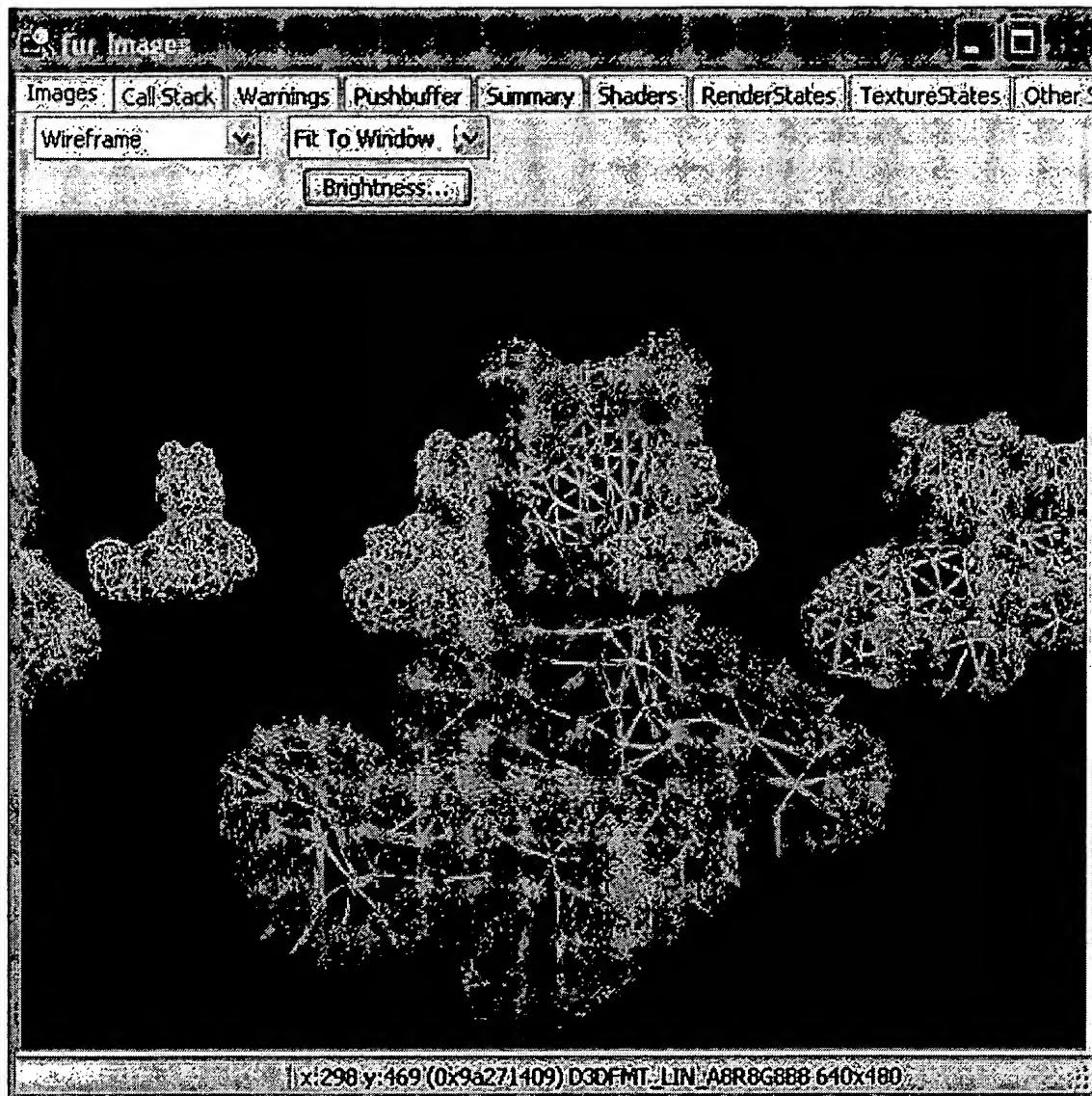


Fig. 12

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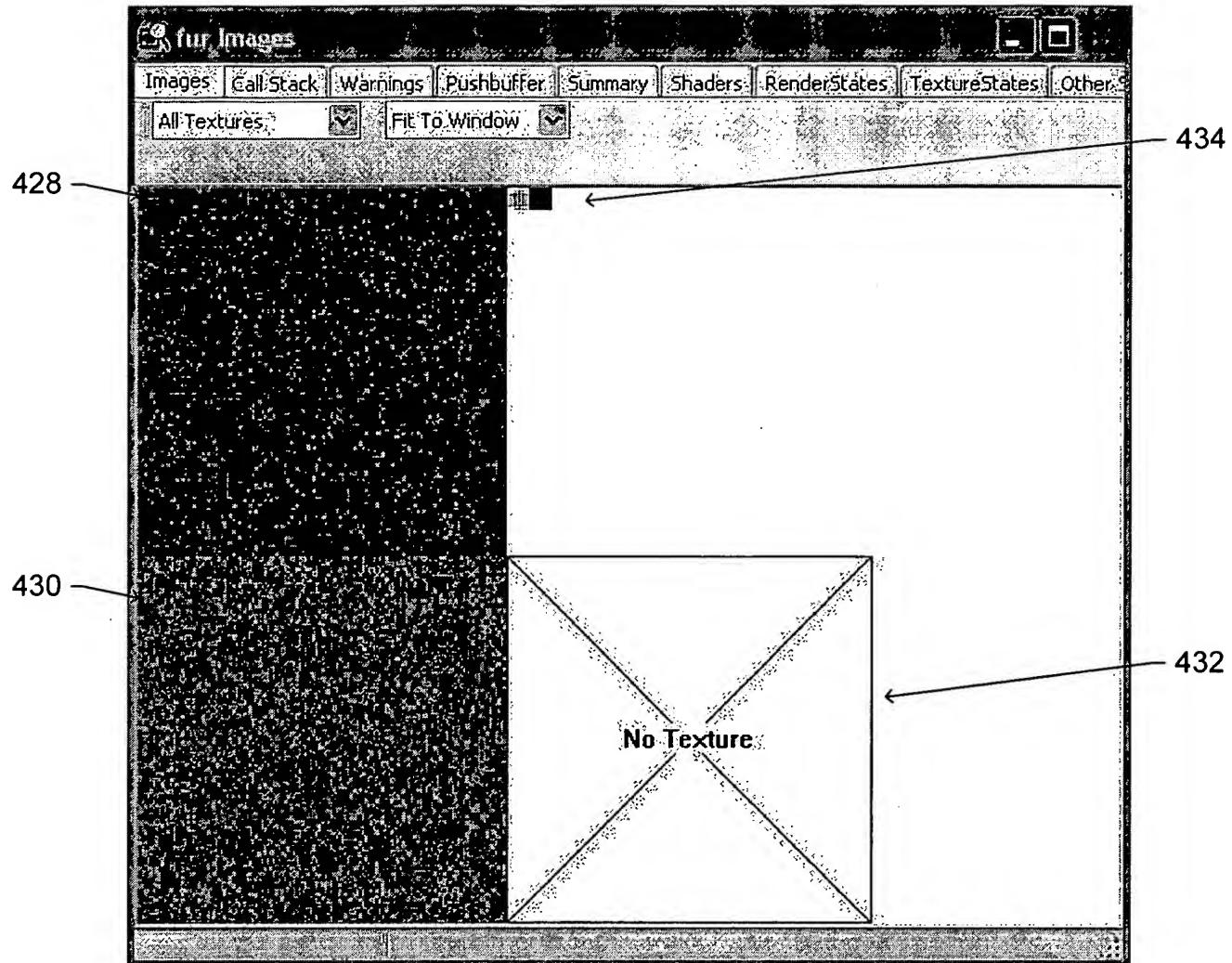


Fig. 13

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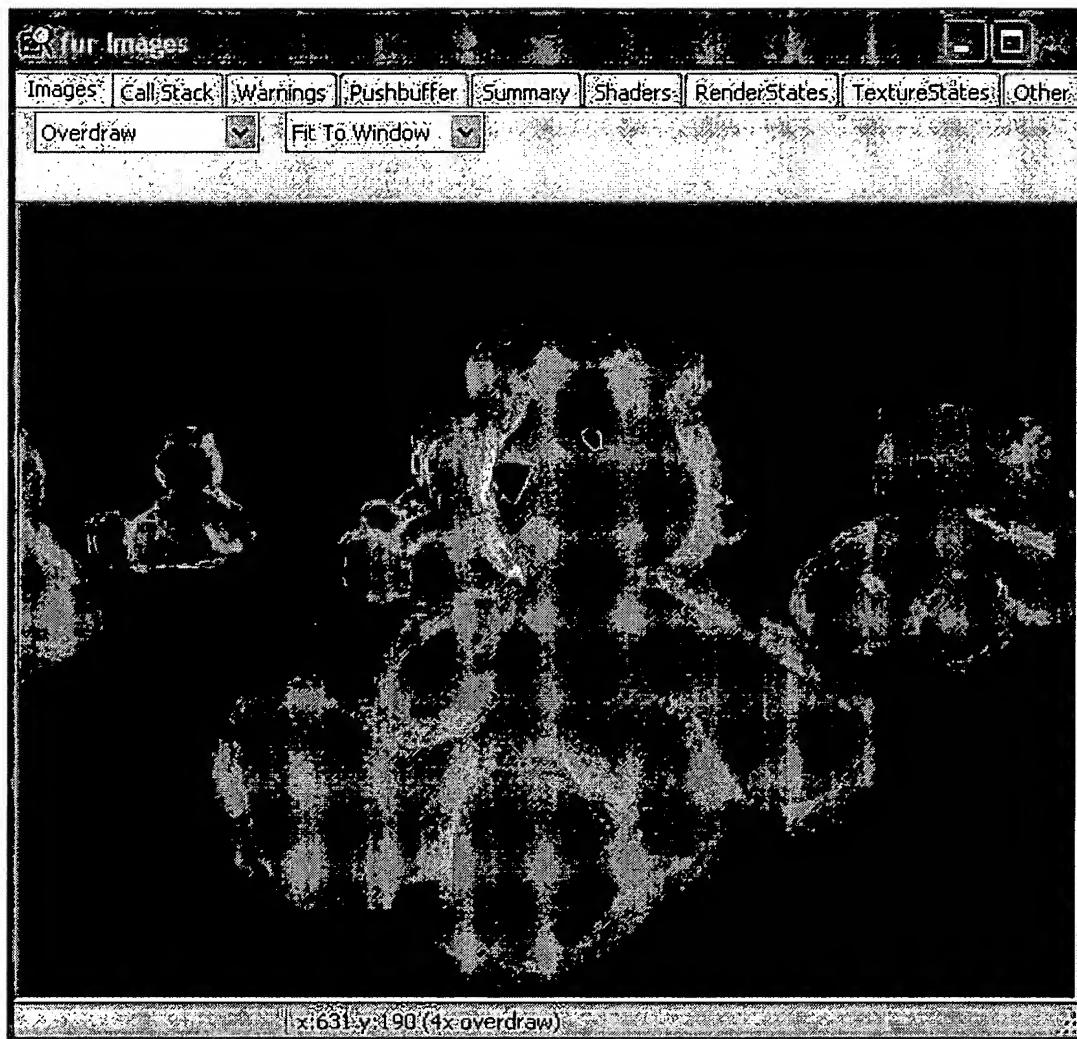


Fig. 14

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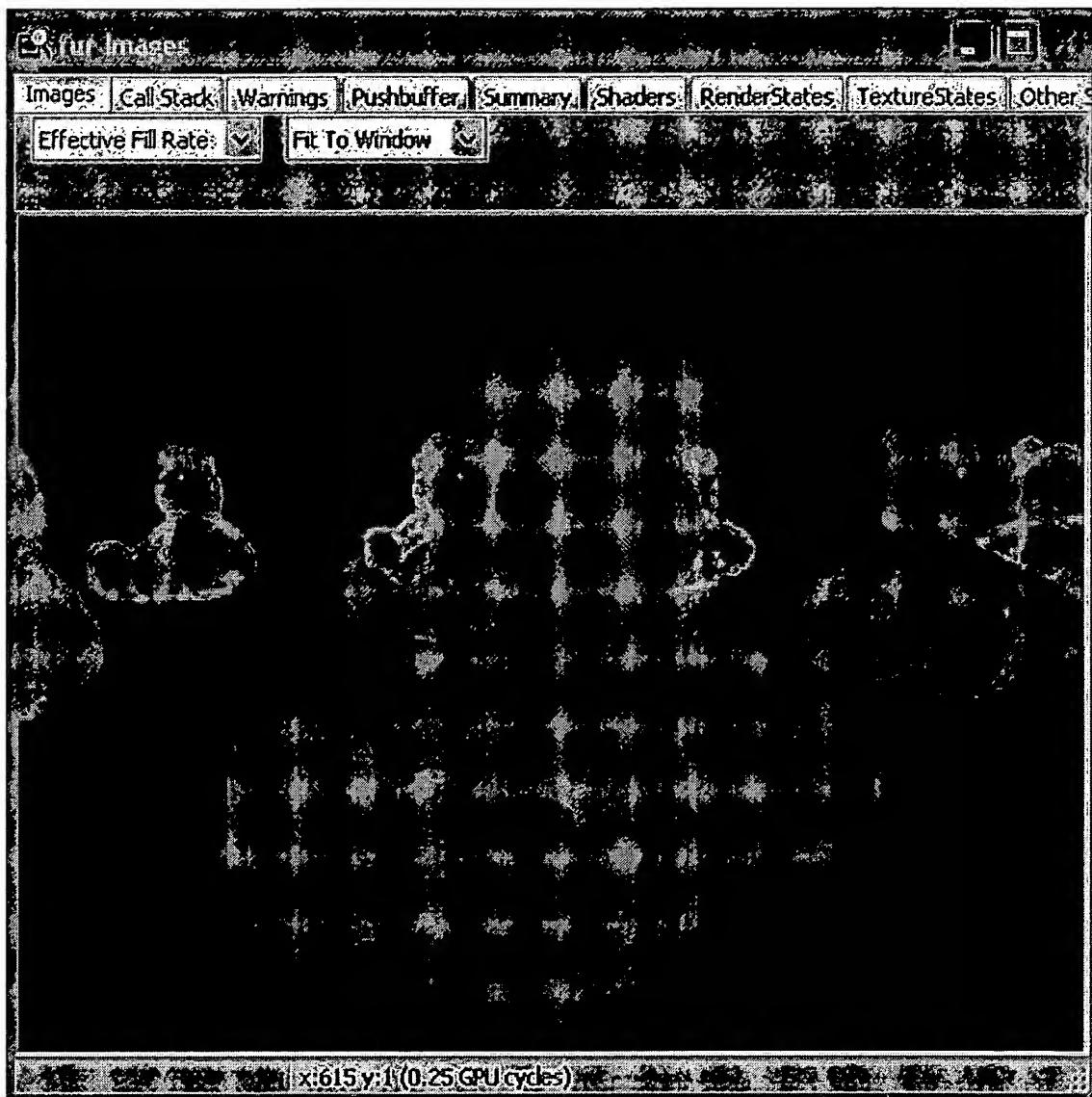


Fig. 15

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Pushbuffer Stack Trace			
Images	Call Stack	Warnings	Pushbuffer
Path to Symbol File: c:\xboxbins\dump		Browse	Resolve Symbols
Event	Symbol	Line	File
BlockOnObject	D3D::BlockOnTime D3D::BlockOnNonSurfaceResource D3DFixup_Reset CXBoxSample::FrameMove CXBApplication::Run main mainXapiStartup	537 1287 1857 363 294 108 54	c:\xbox\private\windows\directx\dxg\d3d8\se\pusher.cpp c:\xbox\private\windows\directx\dxg\d3d8\se\pusher.cpp c:\xbox\private\windows\directx\dxg\d3d8\se\pushres.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\atg\samples\common\src\xbapp.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\ntos\xapi\dll\xapi0.c
Clear	D3DDevice_Clear CXBoxSample::Render main mainXapiStartup	74 383 108 54	c:\xbox\private\windows\directx\dxg\d3d8\se\clear.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\ntos\xapi\dll\xapi0.c
RunPushBuffer	D3DDevice_RunPushBuffer CXBoxSample::Render main mainXapiStartup	122 386 108 54	c:\xbox\private\windows\directx\dxg\d3d8\se\pushres.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\ntos\xapi\dll\xapi0.c
DrawVerticesUP			
DrawVertices			
Begin/End	D3DDevice_Begin CXBFont::Begin CXBoxSample::Render main mainXapiStartup	1196 448 387 108 54	c:\xbox\private\windows\directx\dxg\d3d8\se\drawprim.cpp c:\xbox\private\atg\samples\common\src\xbfont.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\atg\samples\graphics\pushbuffer\pushbuffer.cpp c:\xbox\private\ntos\xapi\dll\xapi0.c

Fig. 16



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fur Warnings			
Images	Call Stack	Warnings	Pushbuffer
Summary	Shaders	RenderStates	TextureStates
Other State			
<input checked="" type="checkbox"/> Display Priority 1 Warnings	<input checked="" type="checkbox"/> Display Priority 2 Warnings	<input checked="" type="checkbox"/> Display Priority 3 Warnings	
ID	Event	Priority	Message
3	Clear	3	If all redundant state setting were perfectly eliminated, rendering of entire scene would be 0.
		2	The CPU's floating point precision is set to 53 bits. Consider calling _controlfp_PCF_24, _MD
4	Begin/End	3	Vertex shader is writing to 9 output registers that are unused by the current pixel shader.
		3	To make best use of pixel pipelines and swathing, use a single clipped triangle that covers th
74	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
106	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
138	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
173	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
206	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
210	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
243	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
247	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
280	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
282	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
284	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
288	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
321	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
325	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
329	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
333	DrawIndexedVertices	3	Vertex shader is writing to 1 output registers that are unused by the current pixel shader.
336	Begin/End	2	D3DPRESENT_INTERVAL_ONE_OR_IMMEDIATE and D3DPRESENT_INTERVAL_TW

Fig. 17



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Fig. 18



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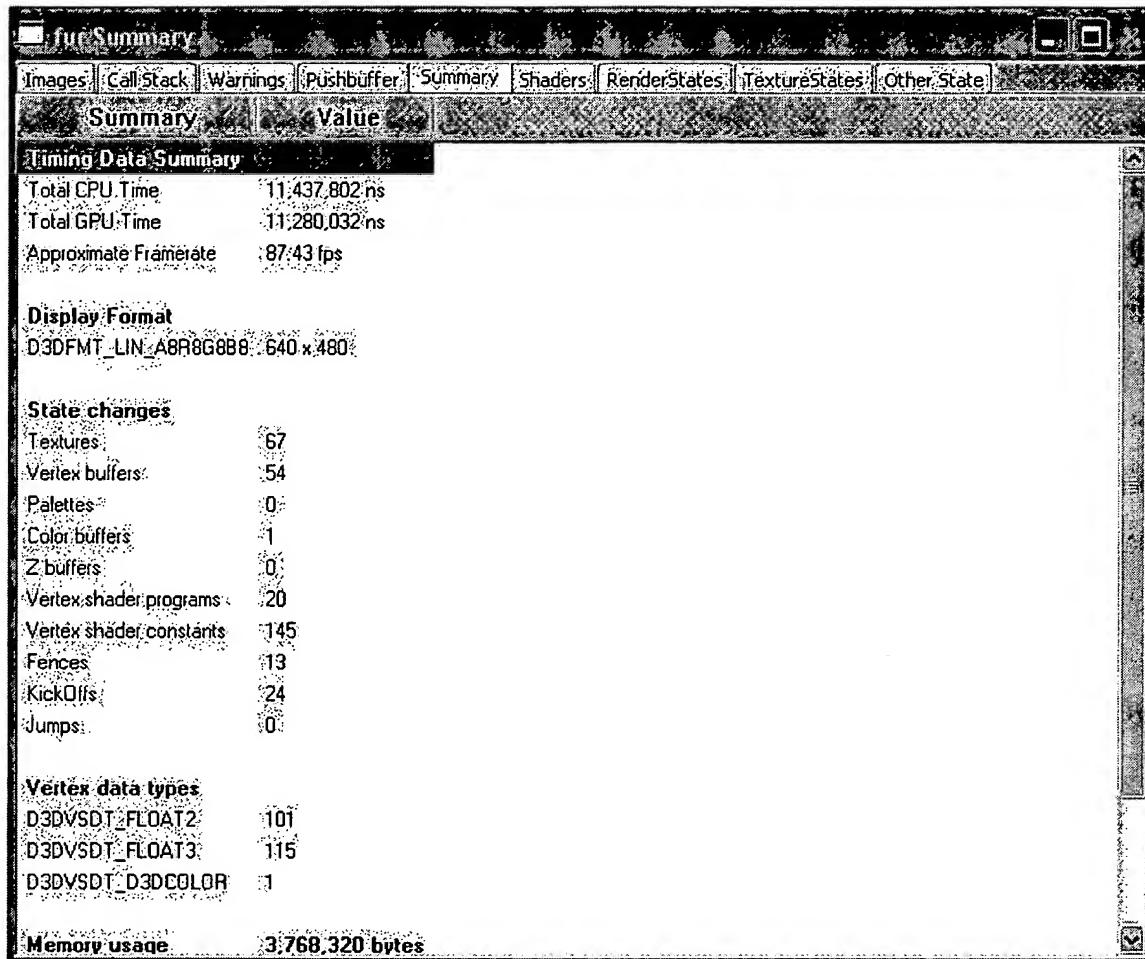


Fig. 19



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for Shader Programs

Images Call Stack Warnings Pushbuffer Summary Shaders Render States Texture States Other State

Vertex Shader  Copy To Clipboard

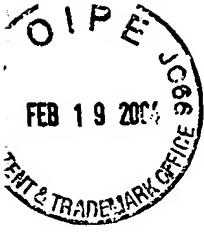
```
0: ( -0.50) mov r1, v0
1: (A 2.00) mov oD0, v3
   + rcp r1.w, r1.w
2: ( -0.50) mov oEog, v4.w
3: ( -0.50) mul r2, r1, c=96
   + mov oD1, v4
4: (G 1.00) add oPos, r2, c=95
5: ( -0.50) mov oPcs, v1.x
6: ( -0.50) mov oB0, v7
7: ( -0.50) mov oB1, v8
8: ( -0.50) mov oT0, v9
9: ( -0.50) mov oT1, v10
10: ( -0.50) mov oT2, v11
11: ( -0.50) mov oT3, v12
   + // end
Final Stall: 0.300
```

Fig. 20

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RenderState	Value
D3DRS_ALPHABLENDENABLE	TRUE
D3DRS_ALPHAFUNC	D3DCMP_GREATEREQUAL
D3DRS_ALPHAREF	0x08
D3DRS_ALPHATESTENABLE	TRUE
D3DRS_BACKFILLMODE	D3DFILL_SOLID
D3DRS_BLENDCOLOR	0x00000000
D3DRS_BLENDOP	D3DBLENDOP_ADD
D3DRS_COLORWRITEENABLE	D3DCOLORWRITEENABLE_ALL
D3DRS_CULLMODE	D3DCULL_CCW
D3DRS_DEPTHCLIPCONTROL	D3DDCC_CULLPRIMITIVE
D3DRS_DESTBLEND	D3DBLEND_INVSRCALPHA
D3DRS_DITHERENABLE	FALSE
D3DRS_DONOTCULLUNCOMPRESSED	FALSE
D3DRS_DXT1NOISEENABLE	FALSE
D3DRS_EDGEANTIALIAS	FALSE
D3DRS_FILLMODE	D3DFILL_SOLID
D3DRS_FOGCOLOR	0x00000000
D3DRS_FOGDENSITY	?
D3DRS_FOGENABLE	FALSE
D3DRS_FOGEND	?
D3DRS_FOGSTART	?
D3DRS_FOGTABLEMODE	D3DFOG_NONE
D3DRS_FRONTFACE	D3DFRONT_CW
D3DRS_LIGHTING	FALSE
D3DRS_LINEWIDTH	1.000
D3DRS_LOCALVIEWER	FALSE

Fig. 21



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Texture State	Value
Texture Unit 0	
D3DTSS_ADDRESSU	D3DTADDRESS_WRAP
D3DTSS_ADDRESSV	D3DTADDRESS_WRAP
D3DTSS_ADDRESSW	D3DTADDRESS_WRAP
D3DTSS_ALPHAKILL	D3DTALPHAKILL_DISABLE
D3DTSS_BORDERCOLOR	0x00000000
D3DTSS_BUMPPENVLOFFSET	-
D3DTSS_BUMPPENVLSCALE	-
D3DTSS_BUMPPENVMAT00	-
D3DTSS_BUMPPENVMAT01	-
D3DTSS_BUMPPENVMAT10	-
D3DTSS_BUMPPENVMAT11	-
D3DTSS_COLORKEY	0x00000000
D3DTSS_COLORKEYOP	D3TCOLORKEYOP_DISABLE
D3DTSS_COLORMASK	0
D3DTSS_MAGFILTER	D3DTEXF_LINEAR
D3DTSS_MAXANISOTROPY	0
D3DTSS_MAXMIPLEVEL	0
D3DTSS_MINFILTER	D3DTEXF_LINEAR
D3DTSS_MIPFILTER	D3DTEXF_LINEAR
D3DTSS_MIPMAPLODBIAS	0.000
D3DTSS_TEXCOORDINDEX	?
D3DTSS_TEXTURETRANSFORMFLAGS	?
Texture Unit 1	
D3DTSS_ADDRESSU	D3DTADDRESS_WRAP

Fig. 22



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Sur Other State	
Images	Call Stack
Warnings	Pushbuffer
Shaders	Summary
Render States	Texture States
Other State	
State	Value
Color buffer	640x480, D3DFMT_LIN_A8R8G8B8, address 0x3d04000, pitch 0xa00
Depth buffer	
Color tile	Tile 0, address 0x3d04000, pitch 0xa00, size 0x259000
Depth tile	
Scissors	Inclusive, [0, 0, 640, 480]
Depth clip planes	0.0, 167 / 215; 0
Visibility Test	FALSE
Texture 0	Texture 128x256, D3DFMT_A4R4G4B4, address 0x3bc8000
Texture 1	
Texture 2	
Texture 3	
Stream v0	D3DVSDT_FLOAT3, address 0x3a9b000, pitch 0x10
Stream v1	
Stream v2	
Stream v3	D3DVSDT_D3DCOLOR, address 0x3a9b00c, pitch 0x10
Stream v4	
Stream v5	
Stream v6	
Stream v7	
Stream v8	
Stream v9	
Stream v10	
Stream v11	
Stream v12	
Stream v13	
Stream v14	

Fig. 23

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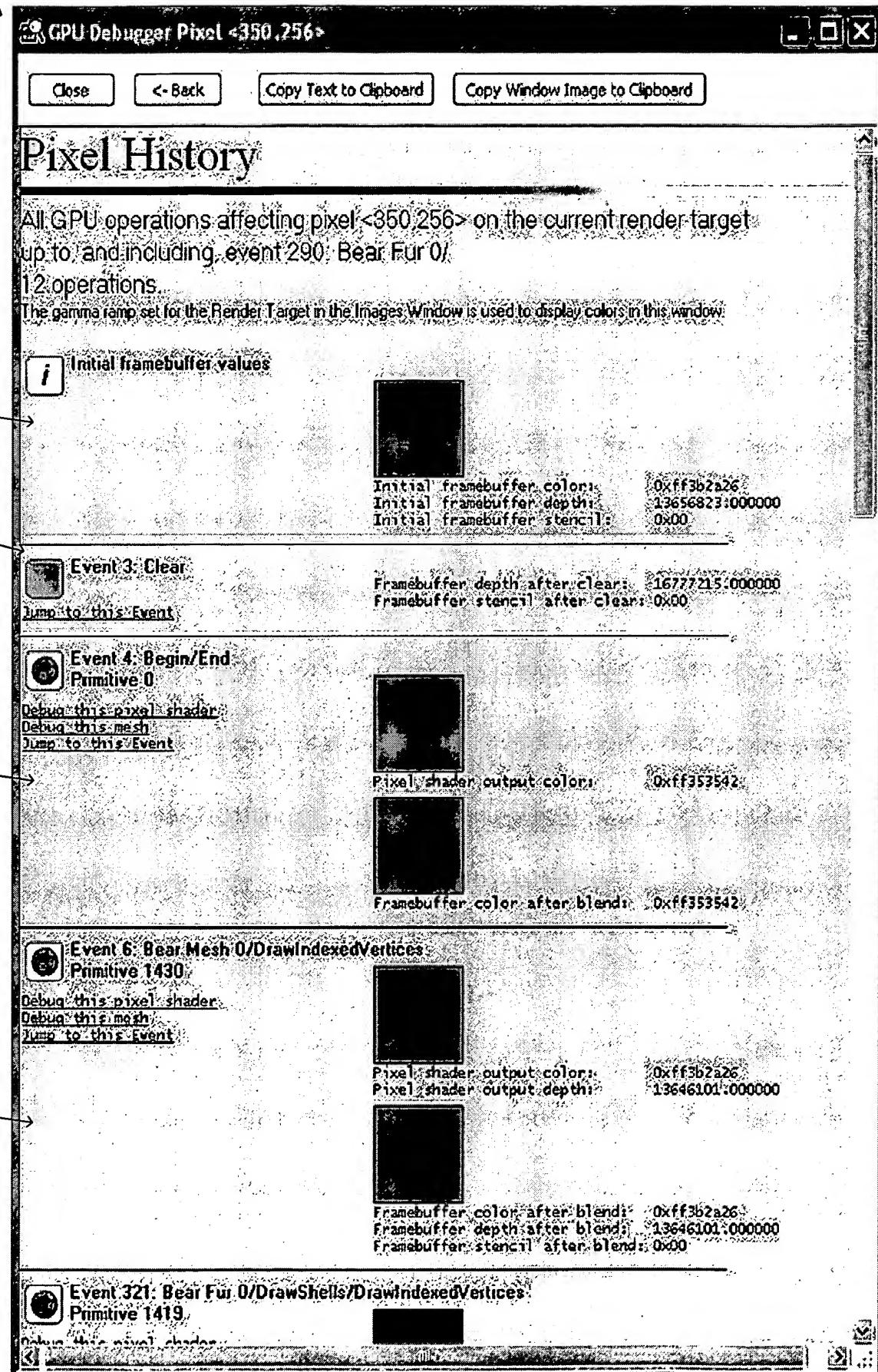


Fig.  
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GPU Debugger Event 4, Vertex 0, Pixel <350,256>

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## Pixel Shader Debugger

Pixel <350,256>  
Event 4: Begin/End  
The gamma ramp set for the Render Target in the Images Window is used to display colors in this window.

Reg	A	R	G	B	Color
-----	---	---	---	---	-------

**combiner.0**

```
mov r0.rgb, v0.sat.rgb
+ mov r0.a, v0.sat.a
```

Inputs:

v0: 0x0ff 0x035 0x035 0x042	[color swatch]
-----------------------------	----------------

Outputs:

r0: 0x0ff 0x035 0x035 0x042	[color swatch]
-----------------------------	----------------

**Final Combiner**

```
xfc zero sat.rgb zero sat.rgb zero sat.rgb r0 sat.rgb zero sat.rgb zero
```

Inputs:

r0: 0x0ff 0x035 0x035 0x042	[color swatch]
-----------------------------	----------------

Outputs:

Out: 0xff 0x35 0x35 0x42	[color swatch]
--------------------------	----------------

This pixel was rendered using a vertex shader program from the following primitive with 3 vertices:

Index	v0	v1	v2
0:	-0.5 -0.5 1	-0.304635 -0.212378 -0.92849 1	0.101961 0.101961 0
1:	639.5 -0.5 1	-0.304635 -0.212378 -0.92849 1	0.101961 0.101961 0
2:	639.5 479.5 1	-0.304635 -0.212378 -0.92849 1	0.301961 0.301961

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Fig. 25



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GPU Debugger: Event 4, Vertex 0

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### Vertex Shader Debugger

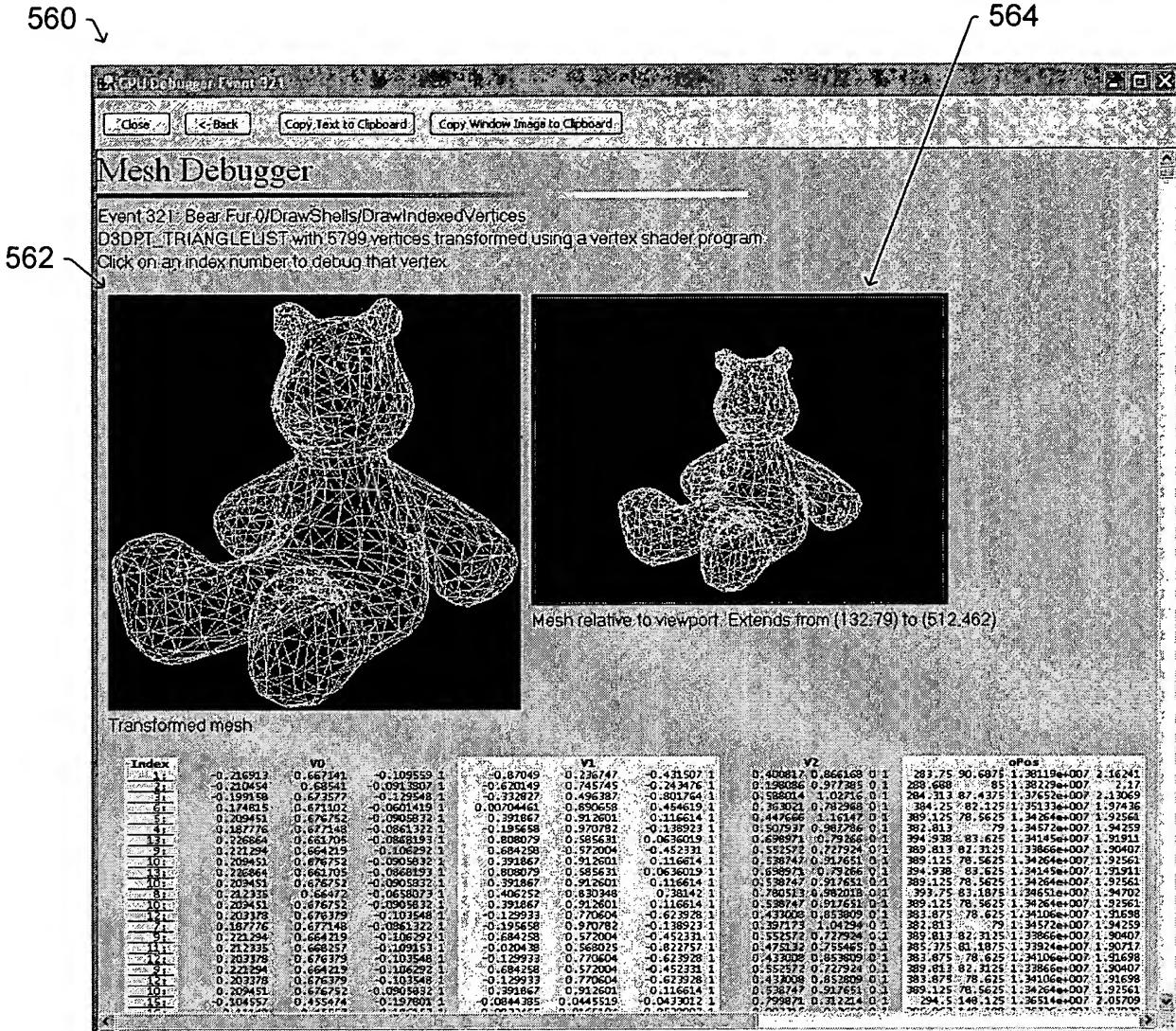
Event 4: Begin/End  
Vertex 0  
12 instructions:

	Outputs					Inputs					
	Reg	X	Y	Z	W	Reg	X	Y	Z	W	
0:	mov r1, v0										
	r1:	-0.5	-0.5		1		v0:	-0.5	-0.5		1
1:	mov oD0, v3 + rcp r1.w, r1.w										
	oD0:	0.0625	0.0625	0.101961		1	V3:	0.0625	0.0625	0.101961	
	r1:	-0.5	-0.5		1	1	r1:	-0.5	-0.5		1
2:	mov oFog, v4.w										
	oFog:	0	0	0.542101e-020			V4:	0	0	0.542101e-020	
3:	mul r2, r1, c-96 + mov oD1, v4										
	r2:	-0.5	-0.5	1.67772e+007		1	r1:	-0.5	-0.5	1	1
	oD1:	0	0	0.542101e-020			c-96:	1	1	1.67772e+007	
							V4:	0	0	0.542101e-020	
4:	add oPos, r2, c-95										
	oPos:	0	0	1.67772e+007		1	r2:	-0.5	-0.5	1.67772e+007	
							c-95:	0.5	0.5	0.542101e-020	
5:	mov oPtx, v1.x										
	oPtx:	-0.25	-0.25	-0.304635	-0.304635		V1:	-0.25	-0.1875	-0.92849	
6:	mov oB0, v7										
	oB0:	1	1	1		1	V7:	1	1	1	

Fig. 26

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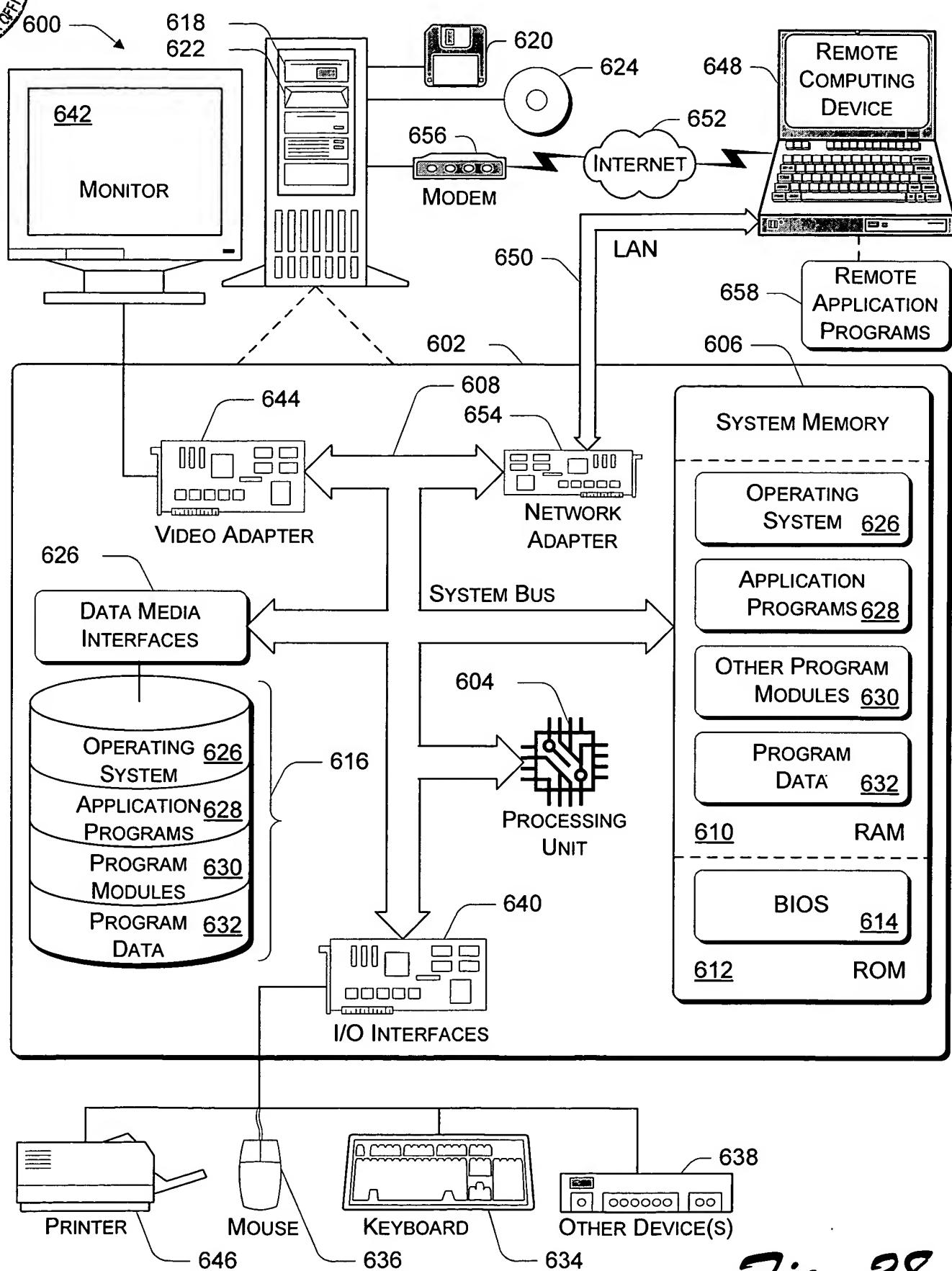


Fig. 28